

What is claimed is:

1. A method for modifying an animation wireframe having a plurality of points with a two-dimensional (2D) representation having a shape surface or a depth map, comprising:

5 scaling the animation wireframe in a first direction based on a plurality of distances between feature pairs within a plurality of features, the plurality of features being within the depth map; and

adjusting in a second direction the location of a first animation-wireframe point to correspond to a first point on the shape surface.

10 2. The method of claim 1, wherein said adjusting is performed for a plurality of animation-wireframe points corresponding to points on the shape surface within a plane in a second direction.

15 3. The method of claim 1, wherein said scaling further comprises the following:

obtaining a primary point within the depth map corresponding to a first feature within the plurality of features;

obtaining an alignment line in the first direction based on the primary point;

20 obtaining a plurality of secondary points within the depth map corresponding to features within the plurality of features that lie along the alignment line; and

calculating a plurality of scaling factors based on the plurality of distances between feature pairs from the plurality of features.

25 4. The method of claim 3, wherein said obtaining the primary point is performed manually.

5. The method of claim 3, wherein said obtaining the plurality of secondary points is performed manually.

5 6. The method of claim 3, wherein:

a first secondary point from the plurality of secondary points corresponds to a lower edge of a forehead,

a second secondary point from the plurality of secondary points corresponds to a bridge of the nose,

10 a third secondary point from the plurality of secondary points corresponds to a bottom of the nose,

a fourth secondary point from the plurality of secondary points corresponds to an upper lip,

15 a fifth secondary point from the plurality of secondary points corresponds to a mouth opening, and

a sixth secondary point from the plurality of secondary points corresponds to a lower lip.

20 7. The method of claim 1, wherein said adjusting further includes the following:

defining a scaling line connecting the first animation-wireframe point and an origin point, the scaling line being within a plane in the second direction;

determining a first shape surface point as the intersection of the scaling line and the shape surface; and

25 adjusting the location of the first animation-wireframe point to coincide with the first shape surface point.

8. The method of claim 1, wherein said adjusting further includes the following:

selecting a tertiary point within the depth map that defines a cut-off plane in the first direction, the cut-off plane in the first direction intersecting with a plane in the second direction to define a limit of the plane in the second direction.

9. The method of claim 8, wherein said obtaining the tertiary point is performed manually.

10. The method of claim 8, wherein said adjusting further includes the following:

defining a first scaling line connecting the first animation-wireframe point and an origin point, the first scaling line being within a plane in the second direction;

determining the first shape surface point as the intersection of the first scaling line and the shape surface;

selecting a second animation wireframe point within the plane in the second direction;

defining a second scaling line connecting the second animation-wireframe point and the origin point, the second scaling line being within the plane in the second direction;

determining the second shape surface point as the intersection of the second scaling line and the shape surface; and

adjusting the location of the second animation wireframe point to correspond to the second shape surface point.

11. The method of claim 10, wherein the location of the first animation wireframe point and the second animation wireframe point are adjusted so that  $L_W'/L_W$  substantially equals  $L_R'/L_R$ , where:

5  $L_W'$  is the length of a first line connecting the first animation wireframe point and the second animation wireframe point along the animation wireframe within the plane in the second direction,

10  $L_W$  is the length of a second line along the animation wireframe within the plane in the second direction, the second line being between the limit of the plane in the second direction and a first intersection point where the animation wireframe within the plane in the second direction intersects a perpendicular line containing the origin point and being perpendicular from the limit of the plane in the second direction,

15  $L_R'$  is the length of a third line connecting the first shape-surface point and the second shape-surface point along the shape surface within the plane in the second direction, and

20  $L_R$  is the length of a fourth line along the shape surface within the plane in the second direction, the fourth line being between the limit of the plane in the second direction and a second intersection point where the shape surface within the plane in the second intersects the perpendicular line.

12. The method of claim 1, further comprising:

providing texture mapping to the animation wireframe based on color data corresponding to the depth map.

25 13. The method of claim 1, further comprising:

providing texture mapping to the animation wireframe based on color data corresponding to the 2D representation.

14. The method of claim 12, further comprising:  
obtaining an alignment point within the color data corresponding to an  
object within the animation wireframe that substantially moves during animation;  
5 and  
matching the alignment point with a corresponding point within the  
animation wireframe.

15. An apparatus for modifying an animation wireframe having a plurality of  
10 points with a two-dimensional (2D) shape surface representation having a  
corresponding depth map, comprising:  
a processor;  
a computer-readable memory coupled to said processor;  
a first input port coupled to said processor and to a range sensor system,  
15 said first input port receiving 2D representation and the corresponding depth  
map;  
a second input port coupled to said processor, said second input port  
receiving the animation wireframe;  
an output port coupled to said processor for forwarding the modified  
20 animation wireframe; and  
said processor scaling the animation wireframe in a first direction based  
on a plurality of distances between feature pairs within a plurality of features, the  
plurality of features being within the depth map;  
said processor adjusting in a second direction the location of a first  
25 animation wireframe point to coincide with a point on the shape surface.

16. The apparatus of claim 15, wherein said processor adjusts in the second direction for a plurality of animation-wireframe points corresponding to points on the shape surface within a plane in a second direction.

5 17. The apparatus of claim 15, wherein the shape surface point lying along a scaling line connecting the animation wireframe point, the shape surface point and an origin point, the scaling line being within a plane in the second direction.

18. The apparatus of claim 15, further comprising:

10 a first storage device coupled to said second input port, said first storage device sending the animation wireframe to second input port.

19. The apparatus of claim 15, further comprising:

15 a second storage device coupled to an output device, said second storage device receiving the animation wireframe from said output device.

20. An apparatus for modifying an animation wireframe having a plurality of points with a two-dimensional (2D) representation having a corresponding shape surface and a corresponding depth map, comprising:

20 means for scaling the animation wireframe in a first direction based on a plurality of distances between consecutive features within a plurality of features, the plurality of features being within the 2D representation; and

means for adjusting in a second direction the location of a first animation wireframe point to coincide with a point on the shape surface.

25 21. The apparatus of claim 20, wherein the shape surface point lying along a scaling line connecting the animation wireframe point, the shape surface point

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and an origin point, the scaling line being within a plane in a second direction.

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